CLAIMS

WHAT IS CLAIMED IS:

1.   A switch comprising:

a plurality of ports configured to receive and transmit a frame;

a fabric manager coupled to the plurality of ports to obtain the received frame and to provide a frame to be transmitted, the fabric manager configured to add information; and

a plurality of interconnected switching units coupled to the plurality of ports so that a frame may traverse multiple switching units in the switch,

wherein the fabric manager is configured to add information to the frame, the information including receive and transmit port identity, the switch identity and about each of the plurality of switching units and interconnections when a frame traverses multiple switching units and to provide the frame for transmission.

2.   The switch of claim 1, the information further including the speed of the port receiving the frame and the link cost of a link connected to the transmit port.

3.   The switch of claim 1, the information further including transmit and receive rates of the port receiving the frame and the port transmitting the frame.

4.   The switch of claim 3, wherein the transmit and receive rates are based on a first defined period.

5.   The switch of claim 4, the information further including transmit and receive rates of the port receiving the frame and the port transmitting the frame based on a second defined period, the second defined period being greater than the first defined period.

6.	The switch of claim 5, the information further including the number of frames and words transmitted and received by the port receiving the frame and the port transmitting the frame.

7.	The switch of claim 4, the information further including the number of frames and words transmitted and received by the port receiving the frame and the port transmitting the frame.

8.	The switch of claim 1, wherein the frame has an original source and an original destination and wherein the fabric manager is configured to add the information to the frame when the frame is traveling from the original source to the original destination.

9.	The switch of claim 8, wherein the fabric manager is configured to add the information to the frame when the frame is traveling from the original destination to the original source.

10.	The switch of claim 1, wherein a node device is connected to one of the plurality of ports and wherein the fabric manager is configured to transmit the frame to the node device.

11.	The switch of claim 1, wherein the fabric manager is configured to select the port to transmit the frame based on normal routing rules.

12.	The switch of claim 11, wherein the frame contains source routing information and wherein the fabric manager is configured to select the port to transmit the frame based on the source routing information.

13.	The switch of claim 12, wherein the fabric manager is configured to use normal routing rules if the source routing information does not indicate a device directly connected to the switch.

23

14. The switch of claim 11, wherein the switch is a Fibre Channel switch, wherein the frame is destination addressed to a well known address, and wherein the fabric manager is configured to determine the true destination address by retrieving data from the frame payload.

15. The switch of claim 1, wherein there are a plurality of equal cost routes that can be used for transmitting the frame and wherein the fabric manager is configured to transmit the frame over all of such routes.

16. The switch of claim 1, wherein the switch is a Fibre Channel switch and the frame is an extended link services frame.

17. The switch of claim 1, wherein the fabric manager is configured to determine if the switch is the original destination of the frame, and if so, modify the frame to cause it to return to the original source.

18. The switch of claim 1, wherein the fabric manager is configured to determine if the switch was the original source of the frame, and if so, to capture the frame and not further transmit the frame.

19. A fabric comprising:
a first switch; and
a second switch coupled to the first switch,
wherein each of the first and second switches includes:

  a plurality of ports configured to receive and transmit a frame; and

  a fabric manager coupled to the plurality of ports to obtain the received frame and to provide a frame to be transmitted, the fabric manager configured to add information to the frame, the information including receive and transmit port identity and the switch identity, and to provide the frame for transmission, and

  wherein at least one of the first and second switches further includes:

24

a plurality of interconnected switching units coupled to the plurality of ports so that a frame may traverse multiple switching units in the switch,

wherein the fabric manager of the switch is configured to add information about each of the plurality of switching units and interconnections when a frame traverses multiple switching units.

20. The fabric of claim 19, the information further including the speed of the port receiving the frame and the link cost of a link connected to the port.

21. The fabric of claim190, the information further including transmit and receive rates of the port receiving the frame and the port transmitting the frame.

22. The fabric of claim 21, wherein the transmit and receive rates are based on a first defined period.

23. The fabric of claim 22, the information further including transmit and receive rates of the port receiving the frame and the port transmitting the frame based on a second defined period, the second defined period being greater than the first defined period.

24. The fabric of claim 23, the information further including the number of frames and words transmitted and received by the port receiving the frame and the port transmitting the frame.

25. The fabric of claim 22, the information further including the number of frames and words transmitted and received by the port receiving the frame and the port transmitting the frame.

26. The fabric of claim 19, wherein the frame has an original source and an original destination and wherein the fabric manager is configured to add the information to the frame when the frame is traveling from the original source to the original destination.

25

27. The fabric of claim 26, wherein the fabric manager is configured to add the information to the frame when the frame is traveling from the original destination to the original source.

28. The fabric of claim 19, wherein a node device is connected to one of the plurality of ports of the first or the second switch and wherein the fabric manager of the respective switch is configured to transmit the frame to the node device.

29. The fabric of claim 19, wherein the fabric manager is configured to select the port to transmit the frame based on normal routing rules.

30. The fabric of claim 29, wherein the frame contains source routing information and wherein the fabric manager is configured to select the port to transmit the frame based on the source routing information.

31. The fabric of claim 30, wherein the fabric manager is configured to use normal routing rules if the source routing information does not indicate a device directly connected to the switch.

32. The fabric of claim 29, wherein each switch is a Fibre Channel switch, wherein the frame is destination addressed to a well known address, and wherein the fabric manager is configured to determine the true destination address by retrieving data from the frame payload.

33. The fabric of claim 19, wherein there are a plurality of equal cost routes that can be used for transmitting the frame and wherein the fabric manager is configured to transmit the frame over all of such routes.

34. The fabric of claim 19, wherein each switch is a Fibre Channel switch and the frame is an extended link services frame.

35. The fabric of claim 19, wherein the fabric manager is configured to determine if the switch is the original destination of the frame, and if so, modify the frame to cause it to return to the original source.

36. The fabric of claim 19, wherein the fabric manager is configured to determine if the switch was the original source of the frame, and if so, to capture the frame and not further transmit the frame.

37. A network comprising:

a first node device;

a second node device; and

a fabric connected to the first and second node devices,

wherein the fabric includes:

a first switch; and

a second switch coupled to the first switch,

wherein each of the first and second switches includes:

a plurality of ports configured to receive and transmit a frame; and

a fabric manager coupled to the plurality of ports to obtain the received frame and to provide a frame to be transmitted, the fabric manager configured to add information to the frame, the information including receive and transmit port identity and the switch identity, and to provide the frame for transmission, and

wherein at least one of the first and second switches further includes:

a plurality of interconnected switching units coupled to the plurality of ports so that a frame may traverse multiple switching units in the switch,

wherein the fabric manager of the switch is configured to add information about each of the plurality of switching units and interconnections when a frame traverses multiple switching units.

38.   The network of claim 37, the information further including the speed of the port receiving the frame and the link cost of a link connected to the port.

39.   The network of claim 37, the information further including transmit and receive rates of the port receiving the frame and the port transmitting the frame.

40.   The network of claim 39, wherein the transmit and receive rates are based on a first defined period.

41.   The network of claim 40, the information further including transmit and receive rates of the port receiving the frame and the port transmitting the frame based on a second defined period, the second defined period being greater than the first defined period.

42.   The network of claim 41, the information further including the number of frames and words transmitted and received by the port receiving the frame and the port transmitting the frame.

43.   The network of claim 40, the information further including the number of frames and words transmitted and received by the port receiving the frame and the port transmitting the frame.

44.   The network of claim 37, wherein the frame has an original source and an original destination and wherein the fabric manager is configured to add the information to the frame when the frame is traveling from the original source to the original destination.

45.   The network of claim 44, wherein the fabric manager is configured to add the information to the frame when the frame is traveling from the original destination to the original source.

46.   The network of claim 37, wherein a node device is connected to one of the plurality of ports of the first or the second switch and wherein the fabric manager of the respective switch is configured to transmit the frame to the node device.

47.   The network of claim 37, wherein the fabric manager is configured to select the port to transmit the frame based on normal routing rules.

48.   The network of claim 47, wherein the frame contains source routing information and wherein the fabric manager is configured to select the port to transmit the frame based on the source routing information.

49.   The network of claim 48, wherein the fabric manager is configured to use normal routing rules if the source routing information does not indicate a device directly connected to the switch.

50.   The network of claim 47, wherein each switch is a Fibre Channel switch, wherein the frame is destination addressed to a well known address, and wherein the fabric manager is configured to determine the true destination address by retrieving data from the frame payload.

51.   The network of claim 37, wherein there are a plurality of equal cost routes that can be used for transmitting the frame and wherein the fabric manager is configured to transmit the frame over all of such routes.

52.   The network of claim 37, wherein each switch is a Fibre Channel switch and the frame is an extended link services frame.

53.   The network of claim 37, wherein the fabric manager is configured to determine if the switch is the original destination of the frame, and if so, modify the frame to cause it to return to the original source.

54. The network of claim 37, wherein the fabric manager is configured to determine if the switch was the original source of the frame, and if so, to capture the frame and not further transmit the frame.

55. A method of providing frame routing information through a switch having a plurality of ports and a plurality of interconnected switching units coupled to the plurality of ports so that a frame may traverse multiple switching units in the switch, the method comprising:

receiving a frame;

adding information to the frame, the information including receive and transmit port identity, the switch identity and about each of the plurality of switching units and interconnections when a frame traverses multiple switching units; and

providing the frame to a port for transmission.

56. The method of claim 55, the information further including the speed of the port receiving the frame and the link cost of a link connected to the port.

57. The method of claim 55, the information further including transmit and receive rates of the port receiving the frame and the port transmitting the frame.

58. The method of claim 57, wherein the transmit and receive rates are based on a first defined period.

59. The method of claim 58, the information further including transmit and receive rates of the port receiving the frame and the port transmitting the frame based on a second defined period, the second defined period being greater than the first defined period.

60. The method of claim 59, the information further including the number of frames and words transmitted and received by the port receiving the frame and the port transmitting the frame.

61.   The method of claim 58, the information further including the number of frames and words transmitted and received by the port receiving the frame and the port transmitting the frame.

62.   The method of claim 55, wherein the frame has an original source and an original destination and the information is added to the frame when the frame is traveling from the original source to the original destination.

63.   The method of claim 62, wherein the information is added to the frame when the frame is traveling from the original destination to the original source.

64.   The method of claim 55, wherein a node device is connected to one of the plurality of ports and wherein the frame is provided for transmission to the node device.

65.   The method of claim 55, wherein the port selected to transmit the frame is based on normal routing rules.

66.   The method of claim 65, wherein the frame contains source routing information and wherein the port selected to transmit the frame is based on the source routing information.

67.   The method of claim 66, wherein normal routing rules are used if the source routing information does not indicate a device directly connected to the switch.

68.   The method of claim 65, wherein the switch is a Fibre Channel switch, wherein the frame is destination addressed to a well known address, and wherein the true destination address is determined by retrieving data from the frame payload.

69.   The method of claim 55, wherein there are a plurality of equal cost routes that can be used for transmitting the frame and wherein the frame is transmitted over all of such routes.

70. The method of claim 55, wherein the switch is a Fibre Channel switch and the frame is an extended link services frame.

71. The method of claim 55, further comprising:

determining if the switch is the original destination of the frame, and if so, modifying the frame to cause it to return to the original source.

72. The method of claim 55, further comprising:

determining if the switch was the original source of the frame, and if so, to capturing the frame and not further transmitting the frame.